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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/432,112	11/02/1999	TAKASHI TSUDA	837.1212/JDH	9637

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STAAS & HALSEY LLP  
700 11TH STREET, NW  
SUITE 500  
WASHINGTON, DC 20001

EXAMINER

JUBA JR, JOHN

ART UNIT

PAPER NUMBER

2872

DATE MAILED: 04/25/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/432,112

Applicant(s)

TSUDA ET AL.

Examiner

John Juba

Art Unit

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– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 February 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8, 15, 16 and 20-62 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-8, 15, 16, 25-28, 33-35, 47, 54, 59 and 60 is/are allowed.
- 6) ☒ Claim(s) 5, 6-8, 20-24, 29-32, 36-46, 48-53, 55-58, 61 and 62 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 48 and 53 are rejected under 35 U.S.C. 102(b) as being anticipated by Delavaux, et al. Referring to Figure 4 and the associated text, Delavaux, et al disclose a plurality of predetermined segment lengths in combination with optical amplifiers and a dispersion compensator providing a dispersion selected from a plurality of stepwise varying dispersions, which compensator is disclosed as locatable between pre- and post-amplifiers (Col. 4, lines 57 – 63). In Figure 4, the pre- and post-amplifiers are illustrated as a single unit, the connection of the dispersion compensator between these elements is best seen in Figure 3. Although Delavaux, et al expressly identify component 5 as a pre-amplifier and component 7 as an “amplifier” (Col. 2, lines 57 – 59), it will be appreciated that component 7 is a “post-amplifier” by virtue of its arrangement after the pre-amplifier.

Claims 48 and 53 are rejected under 35 U.S.C. 102(b) as being anticipated by Ishikawa, et al (U.S. Patent number 5,602,666). Referring to Figures 41, 42, and the associated text beginning in Column 41, Ishikawa, et al disclose a dispersion

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compensator providing a dispersion selected from a plurality of stepwise varying dispersions. Insofar as the channel dispersion is a function of length, the dispersions are inherently determined according to the length of the connecting fibers, and thus to the range of lengths. Ishikawa, et al disclose that a variable dispersion compensator (32) is "associated with" the intervening repeaters. Although elements (22) are identified as "repeaters", Ishikawa, et al disclose that a pair of optical amplifiers are located at preceding and subsequent stages of the compensators (claim 7 of the reference), as exemplified in Figure 39. Figure 39 is a "dispersion compensator package" and comprises a "dispersion compensating unit" between pre- and post-amplifiers. The physical components of one embodiment are shown in Figure 40. The embodiment relied upon in the rejection is not illustrated, but rather is the embodiment employing the "dispersion compensator unit" (32) of Figure 41, in place of the "dispersion compensator unit" (25) of Figure 40.

9/6-17-02 Claims 5 - 8, 20, 21, 61, 62, 22 - 24, 29-32, 36 - 46, <sup>49-52</sup>~~48-52~~, and 55 - 58, are rejected under 35 U.S.C. 102(b) as being anticipated by Chraplyvy, et al. Referring *for example*, to Figures 1 and 2 and the associated text, Chraplyvy, et al disclose an optical system comprising a transmitter, a receiver, a plurality of optical fiber segments and at least one amplifier among the segments. Notably, Chraplyvy, et al anticipate an embodiment in which a dispersion shifted fiber segment is included among the segments (Col. 7, lines 15-17). Chraplyvy, et al further discloses a plurality of dispersion compensators (spooled DCF) (4), (13), (15), (8), (30), (28), (29), and (31)

disposed between pre- and post-amplifiers (17) & (18), (19) & (20), among the plurality of segments, "between" the electro-optical converter (2) and the post amplifier (5) of the transmitter, "between" the multiplexer (21) and post-amplifier of the transmitter (Fig. 2), "between" pre-amplifier (9) and the opto-electric converter (11) of the receiver, and between pre- and post amplifiers in the receiver, ahead of the demultiplexer.

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With regard to claims 6-8, 61, 62, ~~26-28~~ 31-32, 37-38, 40, 41, 44, 45, 50, 51, 56, and 57, Chraplyvy, et al anticipate that the dispersion shifted fiber is typically dispersion shifted for operation at 1.55  $\mu$  (Col. 1, lines 14 - 18), that the conventional fiber segments will have a 1.3  $\mu$  zero-dispersion wavelength (Col. 6, lines 16 - 18), and that the system will include a transmission wavelength of about 1.55  $\mu$  (Col. 6, lines 10 - 20). This is clearly true at least in the WDM case, where eight channels are spaced 1.6 nm apart and centered at about a 1500 nm transmission wavelength.

With particular regard to claims 24 and 46, Chraplyvy, et al expressly disclose that the compensator (31) and amplifiers are part of the receiver (Col. 5, lines 15-17). Thus, it is believed that the illustration (Fig. 2) is in error.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 26, 27, 34, and <sup>35</sup>34 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Delavaux, et al, in view of Ishikawa, et al (U.S. Patent number 5,602,666). As set forth above for claims 25 and 33, Delavaux, et al disclose the invention substantially as claimed. However, Delavaux, et al do not disclose the fiber type or transmission wavelength.

In the same field of endeavor, Ishikawa, et al disclose a plurality of dispersion compensation schemes useful for long-haul optical communications. Ishikawa, et al teach that the use of erbium-doped fiber amplifiers operating at 1.55  $\mu\text{m}$  offers has become commonplace because of the resulting capacity for increased transmission distance and speed (Col. 2, lines 51 - 57). Ishikawa, et al further teach that dispersion compensation is appropriate both for networks employing 1.55  $\mu\text{m}$  dispersion shifted fibers and networks employing 1.3  $\mu\text{m}$  zero dispersion single mode fiber (Col. 3, lines 15 - 20).

It would have been obvious to one of ordinary skill to operate the network of Delavaux, et al at a 1.55  $\mu\text{m}$  transmission wavelength, in the interest of permitting the use of erbium doped fiber amplifiers, and thus in the interest of permitting increased transmission distance and speed, as suggested by Ishikawa, et al. As taught by Ishikawa, et al, 1.3  $\mu\text{m}$  zero dispersion single mode fiber is the fiber already in place in may locations. Thus, barring any *unexpectedly* improved result, it appears that the particular selection of 1.3  $\mu\text{m}$  zero dispersion single mode fiber would have been the obvious choice for integration in the network, in the interest of compatibility with existing installations, as taught by Ishikawa, et al.

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**Allowable Subject Matter**

*25-28*  
Claims 1 - 4, 15, 16, <sup>25-28</sup>33 - 35, 47, 54, 59, and 60 are allowable over the prior art of record. ~~Claims 10, 11, 18, and 19 would be allowable if rewritten to overcome the objection under 37 CFR 1.75 (e).~~ The following is a statement of reasons for the indication of allowable subject matter:

The prior art, taken alone or in combination, fails to teach or to fairly suggest the combination of

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an optical fiber transmission line composed of a plurality of segments each falling within a predetermined range, an optical amplifier between any two adjacent segments, an optical transmitter, an optical receiver, and a dispersion compensator, wherein the compensator is provided between front and rear stage amplifiers of either a transmitter as recited in claims 1, 15, 25, and 33 or the compensator is provided between front and rear stage amplifiers of a receiver, as recited in claims 16, <sup>47,</sup> and 54, and in each case, particularly wherein the dispersion compensator provides a dispersion selected from a plurality of stepwise varying dispersions according to said predetermined range.

**Response to Amendment**

The previous indication of claims 5 - 8, 20, 21, 61, 62, 22 -24, 29-32, 36 - 46, 49 - 52, and 55 - 58 as containing allowable subject matter is withdrawn, in light of

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newly discovered prior art to Chraplyvy, et al. The examiner regrets the delay in applying this reference, and apologizes for any inconvenience.

Applicants' amendment is sufficient in overcoming the previous objection to claims 10, 11, 18, and 19 for not depending from a preceding claim.

As indicated in the advisory action of January 8, 2002, Applicants' remarks are sufficient in overcoming the rejection of claims 25, 28, 33, and 54 under 35 U.S.C. § 102(b) as being anticipated by Delavaux, et al, as well as the rejection of claims 2, 27, 34, and 35 under § 103(a) as being obvious over Delavaux, et al, in view of Ishikawa, et al (U.S. Patent number 5,602,666).

Applicants' remarks are not found persuasive with respect to the rejections of claims 48 and 53 as being anticipated by Delavaux, et al and as being anticipated by Ishikawa, et al. The rejection stands as set forth above.

The rejection of claims 20 and 39-41 as being anticipated by Matsuda, et al (*Electronics Letters*) is withdrawn. New grounds of rejection have been entered.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Although not prior art with respect to Applicants' foreign priority date, Suzuki, et al disclose a dispersion compensated WDM optical system and teach placement of dispersion compensation elements between amplifier stages.



Ishikawa, et al (U.S. Patent number 5,717,510) disclose an optical transmission system with a variable chromatic dispersion compensator located at different points throughout the system.

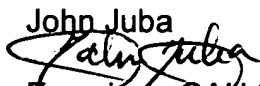
Dugan (U.S. Patent number 5,224,183) disclose a dispersion compensated WDM optical system.

H. Taga, et al (*J. Lightwave Techn.*) disclose a fiber transmission line comprising both single-mode fiber segments and dispersion shifted fiber segments.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Juba whose telephone number is (703) 308-4812. The examiner can normally be reached on Mon.-Fri. 9 - 5.

The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

John Juba  
  
Examiner, GAU 2872

JJ  
April 19, 2002